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Pesticide Fact Sheet Number 29: Thiram

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Pesticide Fact Sheet

Name of Chemical: THIRAM

Reason for Issuance: REREGISTRATION STANDARD /EPA CASE #

Date Issued: June 1, 1984

Fact Sheet Number: 29

1. Description of Chemical

Generic Name: Bis-(dimethylthiocarbamyl) disulfide

Common Name: Thiram

Trade Names: Trade names and other names for thiram are AAtak, Arasan, Delsan, Mercuram, Nomersan, Polyram-Alltra, Pomarsol, Spatrete, Tersan, Thimer, Thiramad, Thirasan, Thiuramin, Trametan, Triampa, Tripamol, Tuads, Vancide, Tetramethylthiuram disulfide, TM-95, TMTD, and TMTDS.

EPA Shaughnessy Code: 079801-7

Chemical Abstract Service (CAS) Number: 137-26-8

Year of Initial Registration: August 5, 1948, DuPont's Tetramethyl Thiuramdisulfide, EPA Reg. No. 352-114

Pesticide Type: Fungicide and Rodenticide

Chemical Family: Organo-sulfur

U.S. and Foreign Producers:

1. E.I. du Pont de Nemours and Company
2. UCB Societe Anonyme, Belgium, for Virginia Chemical Inc., Prochimie International, Inc., and UCB Chemical Corp.
3. R.T. Vanderbilt Company, Inc.
4. Aagrulol Chemicals, B.V., for Aceto Chemical Co., Inc.

2. Use Patterns and Formulations

Application Sites: Fruit, vegetable and ornamental plants (including turf grasses), vegetable and field crop seeds, bananas, propagules of sweet potatoes, tree seedlings, bulbs and cuttings of ornamental bulbs, soil, textiles, polyurethane, wood pulp; and sites around homes, airports, seedling nurseries.

Types of Formulations: Dusts, Wettable Powders and Flowable Suspensions.

Types and Methods of Application: Dusting, Spraying and Dipping.

Application Rates: See Use Patterns in EPA Compendium of Registered Pesticides, Vol. II, Fungicides and Nematicides, Part I, Pages T-30-00-01 through T-30-00-09.

Usual Carriers: Marl, Talc, Clays, Petroleum Oil, Graphite, Vermiculite, Mineral Oil, Charcoal and Water.

3. Scientific Findings

Chemical Characteristics:

Physical State: Powder (Micromilled)
Color: Cream to White
Odor:
Boiling Point: Not Applicable
Melting Point: Range 155-156°C
Flash Point: > 300° F

Toxicity Characteristics:

All toxicological data reviewed by the Agency were found to be lacking in information for evaluation, such as identification of compound tested, dose response information, individual animal information, pathology reports, etc.

Physiological and Biochemical Behavioral Characteristics:

Foliar Absorption: The available data do not provide direct evidence that thiram is or is not absorbed by roots or aerial portions of plants.

Translocation: There is inadequate data to conclude that thiram is translocated in plant tissue, but indirect evidence exists to indicate thiram or a degradate of thiram may enter plant tissue.

Mechanism of Pesticidal Action: Not understood as a fungicide. As a repellent to rodents.

Metabolism and Persistence in Plants and Animals: The metabolism of thiram in plants and animals is not adequately understood.

Environmental Characteristics:

Adsorption and Leaching in Basic Soil Types: Inadequate data.

Microbial Breakdown: Inadequate data.

Loss from Photodecomposition and/or Volatilization: No data.

Bioaccumulation: No data.

Resultant Average Persistence: No data.

Ecological Characteristics:

Hazards to fish and wildlife

Rainbow trout 96-hr LC₅₀ = 0.130
Bluegill sunfish 96-hr LC₅₀ = 0.044

(Characterized as "very highly toxic" to both cold water and warm water fish.)

Thiram is "moderately toxic" to birds. There is insufficient information to fully characterize the toxicity of thiram to mammals. Generally, the subcutaneous toxicity is "high," the acute oral toxicity is slight to "moderate," and in some species (mouse) "practically non-toxic." Thiram is characterized as "relatively non-toxic" to honeybees and predaceous ladybird beetles.

Potential problems Related to Endangered Species:

Additional data (estimated environmental concentrations, persistence, avian reproduction studies, accumulation) are required to complete the endangered species assessment for thiram.

Efficacy Review Results:

No efficacy reviews were made.

Tolerance Assessments:

1. List of Crops and Tolerances:

The following table lists the present status for tolerances in parts per million for residues of thiram:

Raw Agricultural Commodity	U.S.	Canada	Mexico	Codex
Apples	7	0.1	7	3b
Bananas	7a	1.0	-	1c
Celery	7	-	7	5b
Onions (dry bulb)	0.5	-	0.5	-
Peaches	7	7	7	3b
Strawberries	7	7	7	3b
Tomatoes	7	7	7	3b

- 7 parts per million in or on bananas (from preharvest and postharvest application) of which not more than 1 part per million shall be in the pulp after peel is removed and discarded.
- A temporary Codex MRL for the residues of dithiocarbamates (of which thiram is a member) expressed in terms of mg CS₂/kg, has been established.
- Temporary Codex MRLs of 1 and 0.1 ppm have been established for total dithiocarbamates residues (including thiram expressed as ppm CS₂) in or on whole bananas and banana pulp, respectively.

2. Seed Applications:

No tolerances have been established for thiram residues in or on any crop for which thiram is registered solely for seed treatment, because heretofore seed treatment uses have been considered to be nonfood uses. These crops include: barley, beans (dry and succulent), lima beans, beets, broccoli, brussels sprouts, cabbage, cantaloupe, carrots, castor bean, cauliflower, collards, corn (sweet and field), cotton, cowpeas, cucumber, eggplant, endive, flax, forage-fodder grasses, kale, kohlrabi, lentils, lettuce, millet, muskmelons, mustard, oats, okra, onion, peanuts, peppers, pumpkins, radish, rice, rye, safflower, sesame, small-seeded legumes, sorghum, soybeans, spinach, sugar beets, sunflower, swiss chard, tomato, turnips, watermelon, and wheat.

Results of Tolerance Assessment:

Insufficient data are available to assess the adequacy of the tolerance for thiram in or on all thiram-treated commodities having such tolerances: apples, bananas, celery, onions (dry bulb), peaches, strawberries, and tomatoes (40 CFR 180.132). Note that either green onions must be deleted from thiram labels or residue data and a tolerance proposal must be submitted. Also note that the in-furrow treatment for cotton must either be removed from thiram labels or residue data and tolerance proposals must be submitted for forage, seed, and processed products. In addition, many seed treatment uses are registered for thiram on crops not having tolerances for thiram; the continued "nonfood" classification of these uses is contingent upon the receipt of plant metabolism studies demonstrating that thiram residues of concern are not translocated into food/feed crops grown from thiram-treated seed. If residues of concern are translocated, then residue data and tolerance proposals must be submitted for all of these crops (or at least all of the representative commodity members of each involved crop group). Finally, tolerances for thiram animal products have not been established; if the requested animal metabolism studies reveal that thiram residues of concern are transferred to animals, then animal residue data (feeding studies) and appropriate tolerance proposals will be required for ruminants and poultry. It is imperative that the metabolism of thiram in plants and animals be elucidated, since many of the above-noted data gaps are dependent upon the outcome of the metabolism studies. Refer to the appropriate preceding sections for details of data gaps. The data are insufficient to allow the establishment of any crop group tolerances.

No ADI has been established for thiram. The TMRC is 0.7380 mg/day based on a 1.5 kg diet and the relevant tolerances (40 CFR 180.132) and food factors.

Problems that are Known to Have Occurred with Use of the Chemical.

Two workers exposure effects have been identified:

1. Illness in pine seedling planters and handlers resulting from handling thiram-treated pine seedlings without protective clothing (the illness resulted from the ingestion of alcohol after such an exposure).

Note: Thiram is the methyl analog of Antabuse, bis-(diethylthiocarbonyl sulfide), a drug used in rehabilitating alcoholics.

2. Skin rashes of the hands and head resulting from exposure to thiram in handling thiram-treated pine seedlings.

These health effects have been reduced by restrictions that require workers to wear gloves and protective clothing when handling thiram products.

4. Summary of Regulatory Position and Rationale

Based on historical use experience (human health effects reports) and the benefits from the pesticidal uses, the Agency has determined to allow the registration of thiram products to continue for existing use-patterns until the hazards are better defined by the data requirements under the Thiram Registration Standard.

5. Summary of Major Data Gaps

All toxicology data, both acute and chronic studies.

Product chemistry data

Residue chemistry studies

Environmental fate

Hydrolysis studies

Photodegradation studies

Metabolism studies

Mobility studies

Dissipation studies

Accumulation studies

Re-entry

Foliar dissipation studies

Soil dissipation studies

Dermal exposure studies

Inhalation exposure studies

Avian reproduction studies

Field studies with mammals and birds

Aquatic organism studies

Non-target insect studies

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